

proper standards. All medical gases should be included, but more especially nitrous oxid, and ethylene. Oxygen should be certified as to purity, inasmuch as a slight air or nitrogen dilution is productive of inconsistent results. In addition moisture tests are very important, inasmuch as this gas is compressed with soap water as a lubricant. Frequently the cylinders will contain a quantity of accumulated rancid soap water, which has in many instances produced an acute persistent nausea.

#### SPECIFIC RECOMMENDATIONS

Much could be written on medical gas purification and plant management. I shall mention only those points which are of interest to anesthesiologists, and which in the main should apply to the production of all gases.

The progressive producer exerts constant vigilance and keeps close tab on cylinders, as they represent not only a huge investment, but their condition as regards cleanliness and appearance is indicative of either good or poor management. Cylinders should be washed, steam-cleaned, and repainted on each return to the factory. Especially during the past few years during which ethylene has come into general use, as there is always a real danger due to back pressures causing an interchange of gas from one cylinder to another.

Routine washing and steaming removes all gas, traces of grease, soap water and scale, leaving the container absolutely clean and dry. The removal of the iron scale and rust is in itself of great value, inasmuch as fully 90 per cent of all valve trouble on gas-oxygen machines was caused from that source.

Cylinder valves, on each return to the factory, should be removed from the cylinder, taken apart, repaired and inspected before replacing, thus avoiding the inconvenience and expense of leakage.

All raw products used in the preparation of medical gases should be produced or purchased under the most rigid chemical and physical specifications, and price should not be a deciding factor.

In the case of nitrous oxid, only the best grades of ammonium nitrate should be used. Low grade, cheap nitrates are always a source of danger, not only to the manufacturer but to the consumer.

All chemicals entering into neutralizing washes should be of standard grade, the solutions should be titrated to a definite standard which will create a safety factor that will be ample to remove all impurities. These solutions should receive routine analysis and a definite strength should be maintained.

Moisture content plays an important rôle and the modern plant must be equipped with apparatus which will efficiently reduce the moisture to a point where the gas will flow smoothly and without freezing. The plant chemist is indispensable, as every run of gas necessitates not only careful supervision, but an exact moisture determination. The moisture content of medical gases under ordinary conditions of temperature and pressure

within the cylinder should not contain over .009 per cent of water, consequently the driers must receive careful and costly attention.

Chemical analysis is the last and most important procedure in the manufacture of all medical gases. It is true that there are many successful manufacturers throughout the country who rely upon physical findings of their gas, such as odor and color tests. However, I feel that the personal satisfaction derived from routine laboratory findings is well worth the time and expense involved.

With the advent of higher standards of production an adequate method of gas analysis covering the entire field in question has been gradually perfected. The necessary apparatus has been combined into a single unit, thus increasing the accuracy and decreasing the time factor for complete determinations.

In conclusion, I wish to impress the advisability of demanding higher standards in the manufacture of anesthetics as well as a routine analysis of each and every cylinder.

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## THE LURE OF MEDICAL HISTORY

### HIPPOCRATIC MEDICINE\*

#### PART III

By LANGLEY PORTER, M. D.  
San Francisco

THAT surgery, even among primitive men, should have been practical and rational, is not to be wondered at. A combatant drops a rock on the head of his enemy; on the hunting field a wild boar or an angry stag gores the hunter; among the hazards of daily life are sprains, bruises and fractures from numerous causes. Such injuries, it was apparent to the simplest mind, were caused by calculable forces. Equally apparent was the fact that cleanliness, soothing applications and manipulative measures were helpful.

Up to the fifties of the nineteenth century, when Astley Cooper restudied the subject of fractures and dislocations, there was no guide for their treatment other than the Hippocratic directions and these had been in effective use for nearly twenty centuries. And in spite of x-rays and modern ingenuities, even orthopedic surgeons might be stimulated to thought by a study of the Hippocratic methods of reducing dislocations. The treatment of shoulder dislocations is among the most interesting to read.

In Hippocratic times, dislocations were common; in those days athletic games were generally indulged in, because bodily development through gymnastics, particularly wrestling, and its care through the free use of water and sun baths, was considered the major prophylaxis against disease. The centers for athletics were called palaestrae and each palaestra had its own physician-director who soon became skilled in the treatment of fractures and dislocations.

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Part II was printed in the April issue.

Other physicians, attached to armies, became adept in the care of wounds, and the fact that Greeks were adventurous, given to following the sea and to voyaging into far countries, as well as the custom of slave-holding, brought about the development of industrial surgery on a scale that would gladden some of our present-day accident hounds. I shall quote from some of the Hippocratic writings on surgery rendered in the third volume of W. H. S. Jones' edition of the Corpus. The mode of thought used by the writers is strikingly like our own—allowing for the fact that the impossibility of human dissection robbed them of any chance of acquaintance with the details of intermediate anatomy. That the Greeks of those days were thorough masters of surface anatomy is testified to by their wonderful sculptures of the human body as well as by the vase paintings showing the activities of warriors and revelers. The following fragment illustrates their teaching in regard to dislocations of the shoulder:

"Those who have frequent dislocation of the shoulder are usually able to put it in for themselves. For by inserting the fist of the other hand into the armpit they forcibly push up the head of the bone, while they draw the elbow to the chest. And a practitioner would reduce it in the same way if, after putting his fingers under the armpit inside the head of the dislocated bone, he should force it away from the ribs, thrusting his head against the top of the shoulder to get a point of resistance, and with his knees thrusting against the arm at the elbow, should make counter-pressure towards the ribs—it is well for the operator to have strong hands—or, while he uses his hands and head in this way, an assistant might draw the elbow to the chest." . . .

"There is also a way of putting in the shoulder by bringing the forearm on to the spine, then with one hand turn upwards the part at the elbow, and with the other make pressure from behind the joint. This method and the one described above, though not in conformity with nature, nevertheless, by bringing round the head of the bone, force it into place."

The writer goes on with the following criticism:

"The theorizing practitioners are just the ones who go wrong. In fact the treatment of a fractured arm is not difficult, and is almost any practitioner's job, but I have to write a good deal about it because I know practitioners who have got credit for wisdom by putting up arms in positions which ought rather to have given them a name for ignorance. And many other parts of the art are judged thus: for they praise what seems outlandish before they know whether it is good rather than the customary which they already know to be good; the bizarre rather than the obvious. One must mention then those errors of practitioners as to the nature of the arm on which I want to give positive and negative instruction, for this discourse is an instruction on other bones of the body also.

"To come to our subject, a patient presented his arm to be dressed in the attitude of pronation, but the practitioner made him hold it as the archers do when they bring forward the shoulder, and he put it up in this posture, persuading himself that this was its natural position. He adduced as evidence the parallelism of the forearm bones, and the surface also, how that it has its outer and inner parts in a direct line, declaring this to be the natural disposition of the flesh and tendons, and he brought in the art of the archer as evidence. This gave an appearance of wisdom to his discourse and practice, but he had forgotten the other arts and all those things which are executed by strength or artifice, not knowing that the natural position varies in one and another, and that in doing the same work it may be that the right arm has one natural position and the left another. For

there is one natural position in throwing the javelin, another in using the sling, another in casting a stone, another in boxing, another in repose. How many arts might one find in which the natural position of the arms is not the same, but they assume postures in accordance with the apparatus each man uses and the work he wants to accomplish."

Not merely the technical side of the profession interested the writers of the Corpus; to them, matters of deportment and ethics were of paramount importance. A gem worthy to be considered and cherished by those of us who have to meet one another on our daily rounds reads in this way:

"Wherever there is the love of man there also is the love of the art. There is nothing wrong if a physician finds himself embarrassed in the presence of a patient. If on account of his inexperience he fails to comprehend the situation clearly, he should call in other medical men in consultation, so that after a common study it will be possible to be certain about the condition of the patient and to help him. The physicians who come together for consultation should never dispute among themselves or ridicule one another."

#### THE DEPORTMENT OF THE PHYSICIAN

Among the writings is one entitled: "Concerning the physician." It contains a number of interesting precepts governing the deportment of the physician, admonitions about his working place and his instruments, and some advice in regard to minor surgery. Somewhat resembling this is another book entitled "Decorum." In it there is taught that philosophy and medicine are interdependent; it contains precepts instructing the physician how he should enter the sickroom, how he should conduct the examination of the patient, and directions as to the mode of his speech. In this book "Decorum" there are expressions so apt that it seems impossible that they were written twenty centuries ago:

"It is necessary to keep simple remedies ready for use and to take them along on going abroad, for it is impossible for the physician, at the last minute, to choose the things that he needs from amongst many others.

"From the moment that the physician enters the sickroom he must pay attention to the way in which he seats himself, to his behavior, see that he is properly dressed, remain serene in his facial expression, and in his actions, pay careful attention to the patient, responding tranquilly to the latter's objections and not to lose patience or calmness when difficulties present themselves. The most important rule is to repeat the examination frequently in order to avoid the chance of deceiving himself. It is necessary to remember that patients often lie about having taken the remedies prescribed. . . . It is necessary to study the position of the patient in bed, to note the reaction to noises and to odors. All the physician's directions should be given in a quiet and friendly way; nothing should be revealed to the patient of the things that may happen to him or threaten him in the future, because through such knowledge many sick have been pushed to extremity."

Again the ever recurring appeal to reality is found in a paragraph which runs as follows:

"One must attend in medical practice, not primarily to plausible theories, but to experiences combined with reason. If the mind begins to act, not from a clear impression, but from a plausible fiction, it often induces uncertainty and trouble. No harm would be done if bad practitioners received their due wages, but as it is, their innocent patients suffer. Affirmation and talk are deceptive and treacherous, therefore one must hold fast to facts, occupy oneself with facts per-

sistent'y, if one is to acquire that ready and infallible habit which we call the "art of medicine."

From the Hippocratic writings it is clear that, although some Greek citizens were given to the support of medicine as it was practiced in the temples, and while others—probably the great mass of the population—were the victims of magicians and sorcerers and of the venders of amulets and charms, there were still enough clients, especially on the Ionian shores of Asia Minor and in the colonies in southern Italy and Sicily, to support a great and well-organized group of scientific-minded physicians. It is equally clear that this group of practitioners was uninfluenced by magic or philosophy or theology, and that the relations of its members to one another and to those they served were guided by one of the highest ethical conceptions that the human spirit has yet accomplished.

#### THE OATH

The fact that the Asklepiads, of whom Hippocrates provides the outstanding example, were bound to their craft and their clan by an oath strongly testifies to some past affiliation with the priests of Apollo. Furthermore there are many passages in other books—"Aphorisms," "On the Physician," "Precepts," "On Decent Habits"—which show that the physician was called to hold himself to a life of dignity, order, morality and leadership—to be guided by a philosophy of high purpose and of personal detachment, akin to the philosophy that guides the best of theologians. And yet, no trace of the supernatural, tinctures the Asklepiad principles insofar as they touch his art. The oath, which is familiar to every medical man, was sworn to by Apollo the physician, Aesculepius, Hygeia, Panacea, and all the gods and goddesses.

The oath divides into two groups of promises: the first group recited the novitiate's duties to the guild and to his teachers, binding him to treat the children of his teacher as brothers, to teach them without fee, to instruct them fully, and as well those, and only those, other students who have taken the oath. If circumstances made it necessary, he was bound to relieve his teacher's financial distress and to supply him with the means of livelihood.

The second part of the oath was a statement of the physician's duties to his patient. He bound himself to do all good and no harm to those in his charge. To give no poison, to produce no abortion; to live a life of rigid morality, holding sacred the homes to which his profession admitted him, and not to talk about his patients' affairs, no matter how the information had reached him, whether in the course of professional attendance or outside of it.

One passage of the oath which constitutes a promise: "not to operate, not even for stone," has puzzled many a commentator, as the Hippocratic writings clearly show that Greek physicians did operate freely for many things, among them quite often to relieve patients of cystic calculi; there is little doubt that this passage was written in at a

later date. This interpolation occurred probably in medieval times, when medical practice had degenerated and its practitioners become so haughty that they would condescend to do no more than to indicate with the point of a wand the site for incision of an abscess, or the place for the opening of a vein. The dignity of the great man of the Middle Ages could not be degraded by manual labor; a barber or some other base-born attendant must do the actual work.

#### THE HERITAGE FROM GREEK MEDICINE

Out of the records left by the lay medicine of Greece have come two immortal things: one a philosophy, the other a portrait of the imagined Hippocrates; of the ideal physician. That philosophy is summed up in the magnificent first aphorism:

"The art is long; life is short. The opportune moment passes quickly. Experience is fallacious, decision is difficult. Not only must the physician be prepared to do his duty, but he must be able to make the patient, the attendants, the external circumstances conduce to the cure."

#### SINGER'S WORD PICTURE OF HIPPOCRATES

Of the portrait of the idealized Hippocrates, exemplar of what a true physician should be, no one ever has or probably ever will draw a more eloquent word picture than Charles Singer when he wrote that:

"The figure of Hippocrates—physician—has been of incalculable value to the medical profession in the twenty-three centuries that have passed since his death. Calm and effective, humane and observant, prompt and cautious, at once learned and willing to learn, eager alike to get and give knowledge, unmoved save by the fear lest his knowledge may fail to benefit others—both the sick and their servants the physicians—incorruptible and pure in mind and body, the figure of the greatest of physicians has gained, not lost, by time. In all ages he has been held by medical men in a reverence comparable only to that which has been felt toward the founders of the great religions by their followers."

University of California Medical School.

## CLINICAL NOTES AND CASE REPORTS

### BACILLUS PYOCYANEUS SEPTICEMIA\*

#### REPORT OF CASE

#### WITH UNUSUAL BLOOD FINDINGS

By JOHN MARTIN ASKEY, M. D.

Los Angeles

*BACILLUS pyocyaneus* has been reported frequently as the causative culprit in localized infections. Cases of septicemia are relatively few.

The tendency in both localized and blood stream infection toward a normal or low white cell count long has been recognized. Brill and Libman,<sup>1</sup> in reporting two cases of *Pyocyaneus bacillemia* in

\* Thanks are expressed to Dr. S. W. Imerman and Dr. Francis E. Browne for permission to report this case.